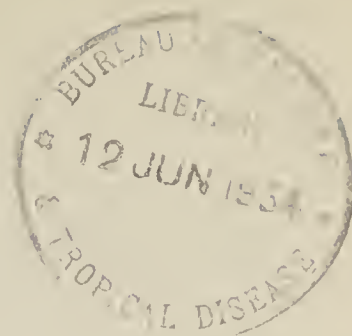


Sudan



A N N U A L _ _ _ R E P O R T
O F _ _ _ T H E
V E T E R I N A R Y _ _ _ S E R V I C E .
1933
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S T A F F.

The composition and distribution of the Veterinary Staff on 31st. December, 1933, was as follows :-

N A M E	DESIGNATION	STATION
Mr. W. Kennedy, D.S.O.	Director	Khartoum
-----*-----		
Dr. S.C.J. Bennett, D.Sc.	Veterinary Research Officer.	Khartoum
Mr. J.T.R. Evans, B.Sc.	Asst/Veterinary Research Officer.	Malakal
-----*-----		
Captain R.S. Audas, M.C., 3N.	Veterinary Inspector	El Fasher
Captain J. Going, 4N.	"	Kassala
Captain C.P. Fisher, 4N.	"	El Ducim
Major J.R. Ellison, 4N.	"	Singa
Capt. T. Menzies, D.V.S.M. (Vict), 4N.	"	Khartoum
Capt. H.B. Williams, O.B.E., 4N.	"	El Obeid
Capt. L.E. Frichard, O.B.E.	"	Wad Medani
Mr. W.H. Glanville,	"	Malakal
MR. J.E. Furney	"	Wad Medani
Mr. J.A. Gillespie	"	El Obeid

The Order of the Nile, 4th. Class, was recently conferred on Captain T. Menzies and Captain H.B. Williams, O.B.E., in recognition of the valuable services rendered by them during the past thirteen years.

A staff of sixty native stock inspectors was employed during the year and, as all these men had formerly served in the Veterinary Police Force, they proved of great assistance to the Veterinary Inspectors they served under, particularly in connection with the supervision of the work of the tribal veterinary staffs.

Reports received from Veterinary Inspectors on the work carried out by the veterinary tribal retainers continue to be generally favourable and indicate that they are steadily becoming more efficient as veterinary intelligence agents and inoculators.

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S E C T I O N I.

D I S E A S E S O F A N I M A L S

G E N E R A L

With the exception of cattle plague, the major diseases of livestock were much less prevalent than in recent years. This remark does not apply to the Provinces of Bahr-el-Ghazal and Mongalla as it has not so far been found possible to provide these Provinces with veterinary staff and, consequently, accurate information as to the conditions prevailing in them is not available. The absence of veterinary staff is to be regretted particularly in the case of Bahr-el-Ghazal Province with its large herds of cattle on which the native owners are dependent for their livelihood. Both cattle-plague and contagious pleuro-pneumonia are reported to have caused very heavy losses in that area in recent years and, if it had been possible to apply modern veterinary methods to the control of these diseases, these losses would have been reduced to a minimum.

I. DISEASES OF CATTLE.

Cattle-Plague.

Cattle-plague was prevalent throughout the country during the period under review and, as in previous years, the heaviest losses were experienced between January and July when large herds of cattle come in close contact with one another in the comparatively few areas which are favoured with permanent water supplies.

The improvement registered in 1932 in the position in regard to this disease was not, unfortunately, maintained in 1933 and the number of deaths recorded this year was 10,135 as compared with 8,812 last year. It is gratifying to note, however, that while the number of cattle involved in the various outbreaks showed an increase of over 50 per cent. on the figure for 1932, the number of deaths recorded increased by 15 per cent. only.

The consolidated returns of outbreaks of cattle-plague for the past five years are as follows :-

Year	No. of Outbreaks	No. of Cattle involved	Number of deaths
1929	795	124,406	12,743 = 10.24%
1930	981	100,540	15,425 = 15.33%
1931	382	177,745	16,812 = 9.46%
1932	503	139,122	8,812 = 6.33%
1933	891	211,243	10,135 = 4.80%

The majority of the outbreaks recorded occurred in herds which had escaped infection for a period of years and the results in these cases would have been disastrous but for the prompt manner in which the presence of the disease was reported, with few exceptions, by the native authorities. The large stocks of cattle-plague anti-serum which were available, together with the assistance rendered by the tribal veterinary staffs, greatly facilitated the task of controlling the disease.

In Darfur Province the heaviest losses occurred in the Fasher and Kuttum Districts and the Baggara herds escaped very lightly. The total losses showed a decrease of nearly 50 per cent. on the figure for 1932. The native authorities reported all outbreaks promptly and attempts to conceal the presence of the disease were very rare indeed.

In Kordofan Province the Humr and Rashad Baggara herds were heavily infected during February, March and April but the liberal use of cattle-plague anti-serum kept the death rate low. The Messeria have been practically free of the disease during the past two years and their losses have been negligible. Cattle owners in the Um Ruaba District suffered considerable losses, and difficulty was experienced in controlling outbreaks in that area owing to the fact that their cattle congregate at two watering centres where they come in contact with stock travelling to and from other areas.

The number of outbreaks which occurred in the Blue Nile Province was nearly double that of the previous year and the resources of the Provincial Veterinary Staff were fully taxed in controlling the disease. Large numbers of natives from neighbouring Provinces seek employment in the irrigated area during the cotton picking season and many of them bring their cattle with them on account of the good grazing which is available. These cattle frequently introduce disease to the Province as they do not all enter via the recognised cattle routes and many thereby evade inspection at the quarantine posts.

Poor rains and scarcity of grazing in Kassala Province resulted in the spread of cattle-plague along the River Gash towards the end of the year, and heavy losses occurred in July, August and September in the Gedaref District. In the latter district many cattle owners are still rather backward in reporting the presence of disease and are somewhat averse to having their cattle subjected to inoculation.

Although cattle-plague was much more prevalent in the White Nile Province than was the case last year, losses from the disease showed only a slight increase on the previous year's figures.

Heavy losses occurred in the Fung Province in the early part of the year, the high mortality being attributable to the lack, in certain areas, of rapid means of communication, with the result that outbreaks had assumed serious proportions before they could be dealt with. Some outbreaks were not reported for a considerable time as the owners were grazing their cattle in forbidden areas and were afraid to disclose their whereabouts.

Twenty-four outbreaks occurred in Khartoum Province and three in Berber Province but all were readily suppressed by the use of serum.

Dongola and Halfa Provinces remained free of the disease during the year, and only a few outbreaks occurred in Upper Nile Province, all of which were successfully dealt with.

Outbreaks of cattle-plague were reported from time to time in Bahr-el-Ghazal Province and losses amounting to 60 per cent. of the cattle involved were stated to have occurred in one area. The Governor repeatedly applied for veterinary assistance but, owing to lack of staff, it was not possible to accede to his requests other than those for supplies of cattle-plague anti-serum.

In the various quarantine stations only two cases of cattle-plague came under notice during the year among cattle intended for export.

The large quantities of cattle-plague anti-serum required by the field veterinary staff in combating the various outbreaks of cattle-plague, were produced at Malakal Serum Laboratory and the output was arranged so satisfactorily that it was found possible to maintain adequate reserve stocks, throughout the year, in all the areas threatened by the disease. Over 100,000 doses of serum were produced at Malakal during the working season and, when the difficulties that had to be overcome in turning out this quantity are realized, the results reflect great credit on both the Veterinary Research Officer and the Assistant Veterinary Research Officer. Further details of the work carried out in this connection will be found in the attached report of the Veterinary Research Officer.

Contagious Bovine Fleuro-Pneumonia.

Contagious bovine pleuro-pneumonia was prevalent during the year in Darfur, Kordofan and Upper Nile Provinces but it was possible to exercise such effective control over the various outbreaks that the total losses from the disease were reduced to about one third of those suffered last year.

Details are available of 43 outbreaks, 27 of which occurred in Kordofan Province, 17 in Darfur Province, 2 in the Blue Nile Province, 1 in Kassala Province and 1 in the White Nile Province. In these outbreaks 23,212 cattle were involved and 499 head, just over 2 per cent., died or were destroyed.

The cattle-owning tribes now have such confidence in the methods adopted by the Veterinary Service to control this disease that they promptly report outbreaks and clamour to have their cattle vaccinated.

In Upper Nile Province outbreaks occurred in six districts and, in dealing with these, 7,234 cattle were vaccinated. Progress continues to be made in obtaining the confidence of the natives of that Province but great difficulty was experienced in some areas in obtaining the consent of the owners to the slaughter of infected animals.

An outbreak of pleuro-pneumonia was reported in Wau township, Bahr-el-Ghazal Province, in May and herds in the neighbourhood became involved in June and July. In the absence of Veterinary Staff in that Province no details are available.

In the various Quarantine Stations seventeen cases of pleuro-pneumonia came under notice during the year amongst cattle intended for export.

Excluding the Provinces of Bahr-el-Ghazal, Upper Nile and Mongalla, the mortality recorded from pleuro-pneumonia during the past five years was as follows :-

1929	.....	1,340	deaths
1930	.....	494	"
1931	.....	1,382	"
1932	.....	1,326	"
1933	.....	499	"

To meet the requirements of the Veterinary Staff in dealing with the various outbreaks which came under notice 26,420 doses of vaccine were issued from the Veterinary Laboratory during the year.

Foot-and-Mouth Disease.

Foot-and-mouth disease appeared amongst the Hawazma cattle near El Obeid, Kordofan Province, in August and rapidly spread throughout the Province involving some thousands of cattle awaiting export to Egypt. Fortunately the outbreak occurred during the rainy season, when grazing and watering conditions were at their best, so that infected cattle made speedy recoveries with little loss of condition. While Kordofan Province remained an infected area cattle for export were drawn from White Nile Province, so that the presence of the disease in Kordofan caused little inconvenience from the point of view of trade.

Five outbreaks occurred in the Fung Province in April but the disease was of the usual mild type and quickly died out.

Trypanosomiasis.

Losses from trypanosomiasis are reported to occur amongst cattle in Southern Darfur and Southern Kordofan, during and at the end of the rainy season, but it has not been possible so far to arrive at any conclusions as to the seriousness or otherwise of these losses. The Arab-owned cattle in the Southern part of White Nile Province are reported to have suffered heavily this year and reports, indicating widespread infection in Upper Nile Province, were also received. A few cases occurred in the Fung Province. The results of the examination of blood smears at the Veterinary Laboratory show that infection was due to T. congolense.

Other Diseases.

Psoroptic mange was fairly prevalent amongst working oxen in the irrigated area, Blue Nile Province, and was the cause of several animals being cast and slaughtered.

An outbreak of haemorrhagic septicaemia occurred in the Blue Nile Province resulting in three deaths.

No cases of anthrax were diagnosed in cattle during the year.

A recently imported pure-bred Jersey bull unfortunately succumbed to Theileriasis at the Belgravia Dairy, Khartoum.

II. DISEASES OF CAMELS.

The major diseases affecting camels in the Sudan are trypanosomiasis, mange and contagious necrosis. Prior to the discovery of "Naganol" and of the mercuric chloride test, trypanosomiasis caused very heavy losses amongst Government camels and was dreaded by all camel owners, but now, thanks to the means which have been placed at our disposal for detecting and curing this disease, losses from it can be avoided wherever veterinary services are available. That camel owners fully appreciate the value of "Naganol" treatment is evidenced by the fact that 2,647 native-owned camels were presented for treatment on payment during the year. Losses from trypanosomiasis in Police and Army units have been reduced to a minimum and it is now possible to use police camels, during and after the rains, in "fly" districts where it was formerly impossible to do so. 719 Government-owned camels were treated for trypanosomiasis during the year.

Outbreaks of mange occurred in the various Provinces where Government camels are used but none assumed serious proportions and all cases responded readily to treatment.

Contagious necrosis was prevalent in Kordofan and Darfur Provinces, during and just after the rains, and in some units 25 per cent. of the camels became infected.

III. DISEASES OF EQUINES

African Horse Sickness.

Cases of African horse sickness were reported in the course of the year from most parts of the country, and several casualties occurred amongst the horses and mules of the Cavalry and Mounted Rifles while operating in the Akobo District, Upper Nile Province. The disease was undoubtedly less prevalent than in recent years and the horse-owning tribes escaped lightly. Seven horses succumbed to the disease in the Blue Nile Province - a marked improvement on last year when 20 valuable horses were lost. The casualties reported from horse sickness amongst horses and mules in Government service (excluding Army animals) were 17, as compared with 10 in 1932 and 42 in 1931.

Epizootic Lymphangitis.

Epizootic lymphangitis was diagnosed at the Veterinary Laboratory from material forwarded during the year from 18 horses, 18 mules and 1 donkey. The total of 37 cases compares favourably with a total of 70 in 1932 and of 80 in 1931. This disease is well known and dreaded in Western Darfur and all cases are now promptly destroyed by order of the various Nazirs and headmen. Four unusual cases of infection came under notice at the Veterinary Laboratory during the year and are described in the report of the Veterinary Research Officer.

Other Diseases.

A tsetse-fly area near Khor Bau, Upper Nile Province, (Lat. $8^{\circ} 50'$. Long. $34^{\circ} 3'$) was unwittingly traversed by the District Commissioner, Nasir, early in the year. He had 87 police and transport animals with him and, of these, 10 horses and 21 mules died later of trypanosomiasis (T. brucei). Several cases of infection by T. brucei and T. congolense also occurred in police donkeys in the Delami area of the Nuba Mountains, Kordofan Province.

Ulcerative cellulitis is reported to have existed for years in South-West Darfur and a campaign against the disease is being carried out by the Nazir of the Beni Helba tribe. All advanced cases have been destroyed and those in the early stages of the disease are isolated pending inspection by a veterinary representative.

IV. DISEASES OF SHEEP AND GOATS.

With the exception of a few outbreaks of contagious caprine pleuro-pneumonia, no notable mortality from infectious or contagious diseases was recorded amongst sheep or goats during the year.

V. DISEASES OF DOGS.

Rabies was definitely diagnosed in dogs at the Wellcome Tropical Research Laboratory from material forwarded for examination from the following Provinces:-

Kordofan	.....	1 case at El Obeid in May.
Mongalla	.....	1 case at Juba in May.
White Nile	.....	1 case at Kosti in June
		1 case at El Dueim in June
		1 case at El Ducim in October.
Blue Nile	.....	1 case at Sennar in October.

The total of six positive cases recorded this year compares favourably with that of fourteen in 1932 but the disease is still undoubtedly widespread.

The Senior Veterinary Inspector, Kordofan Province, reported that an Army horse, which was bitten by a dog while on the march from Darfur in February, subsequently developed rabies in El Obeid and was destroyed.

In order to reduce the incidence of this disease the destruction of all ownerless and stray dogs, as far as circumstances will permit, continues to be carried out throughout the country.

SECTION II.

TRADE IN LIVESTOCK & LIVESTOCK PRODUCTS

I. EXPORT AND IMPORT TRADE

Cattle and Sheep

The stimulus given to trade during the year by a continuance of reduced freights for livestock on the Sudan railways and steamers, coupled with a slight improvement in the prices offered in Egypt, resulted in an increase in the numbers of cattle and sheep exported as compared with 1932. The export figures, however, are still far below the average for previous years and, as it is impossible to effect any further reductions in purchase prices or marketing costs, a return to normal trade conditions can only occur through an increase in the demand for meat in Egypt accompanied by an advance in selling prices.

The supply of cattle for export was well maintained during the year but the average price paid at El Obeid namely, £E.1.376% per head, was unremunerative from the stock owners' point of view.

A widespread outbreak of foot-and-mouth disease which occurred in Kordofan Province in August threatened to interfere seriously with trade but, fortunately, this threat did not materialize and no difficulty was experienced throughout the year in supplying the Egyptian markets with all the cattle and sheep they could absorb.

Further details of the trade in cattle and sheep are given in the following tabulated statements :-

A. Numbers and values of cattle and sheep exported during the last four years.

Year	Cattle	Sheep	Valuation at port of export
1930	9,510	5,773	£E.60,041
1931	5,347	919	" 23,245
1932	3,472	4,271	" 14,763
1933	5,518	4,963	" 24,210

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B. Numbers of cattle imported during the last four years:-

Y e a r	: French : : Equatorial : : Africa :	: Eritrea :	: Abyssinia :	: Total :
1930	: 3,170 :	: 8 :	: 1,605 :	: 4,783 :
1931	: 65 :	: 16 :	: 839 :	: 920 :
1932	: 113 :	: 36 :	: 301 :	: 450 :
1933	: 401 :	: 20 :	: 782 :	: 1,203 :

C. Origin of cattle exported during the last three years:-

P r o v i n c e	: 1931 :	: 1932 :	: 1933 :
Darfur & Kordofan	: 4,624 :	: 3,255 :	: 4,910 :
White Nile	: 88 :	: 100 :	: 700 :
Upper Nile	: 299 :	: 20 :	: 40 :
Bahr-el-Ghazal...	: 230 :	: 20 :	: - :
Khartoum	: 101 :	: 75 :	: 160 :
Berber	: - :	: - :	: 350 :
Kassala	: 5 :	: - :	: - :

D. Average market prices and total numbers of cattle sold for export in El Obeid market during the last four years :-

Y e a r	: Number of : : Cattle sold :	: Average : : price :
		: <u>£E.Mms</u> :
1930	: 5,780 :	: 3.035 :
1931	: 2,126 :	: 2.210 :
1932	: 2,435 :	: 1.405 :
1933	: 2,355 :	: 1.376 :

Camels.

Reports received from the various Provinces indicate that there has been a considerable increase in the number of camels exported to Egypt this year, and it is estimated that the total exceeded 27,000 head.

The Senior Veterinary Inspector, Kordofan Province, reports that the export trade in camels has increased enormously. It ^{is} impossible to get accurate information as to the numbers exported this year but, as far as can be gathered, well over 5,000 camels left the Province. Several of the cattle merchants in El Obeid have entered the market recently and there is a brisk trade in fat animals. The average price during the latter half of the year was about £E.3.500% but as much as £E.7 has been paid for a fat camel.

In Kassala Province there was a good demand for camels for export and an Egyptian buyer, who purchased over 1,000 head at Khashm El Girba, was paying an average price of £E.4.270% during the last three months of the year. Many camel owners held out for higher prices and the majority appear to prefer to dispose of their animals through Rashaida brokers rather than to sell them in the local markets. Permits to export 11,363 camels were issued during the year to Rashaida and Lahawin. It is reported that, since the rains, prices in Egypt have been as high as £E.8 and £E.9 for fat beasts.

It is estimated that 3,689 camels were exported from Berber Province and permits to export 7,090 head were issued to merchants in the Blue Nile and Khartoum Provinces during the year.

M u l e s .

Ninety-six mules were imported from Abyssinia in 1933 and 89 of these were purchased by the Senior Veterinary Inspector, Kassala Province, for the Sudan Defence Force.

Hides and Skins.

Prices of all grades of hides and skins rose steadily from April until July but declined again in September and October almost to their previous low level. In spite of this fall, exports were well maintained, trade was much brisker than last year and the quantities exported were well above the average.

Of 119,633 hides exported by various merchants during the year 90,300, or 75.5 per cent., were "Fashoda" hides, and 29,300, or 24 per cent., were "dry salted".

The quantities of hides and skins exported during the last five years and the average values per ton were as follows :-

Year	H i d e s		S k i n s	
	Tons	Average value per ton	Tons	Average value per ton
1929	1,328	LE. 60.9	1,014	£E.103.5
1930	1,049	" 38.7	950	" 103.4
1931	818½	" 23.8	899½	" 65.1
1932	712	" 16.3	862	" 45.4
1933	1,207	" 30.0	1,057	" 48.9

Samn or Maslee (Clarified Butter).

Exports of samn have steadily increased from 79 tons, valued at £E.7,158, in 1927 to 534½ tons, valued at £E.24,640, in 1933 and, over the same period, imports have declined from 58 tons to 12 tons per annum.

During the year 124 tons of samn were despatched by rail or steamer from White Nile Province and 775 tons were railed from El Obeid to various local markets.

II. INTERNAL TRADE.

The numbers of animals slaughtered for food in ten of the larger towns during the past three years were as follows :-

	1931	1932	1933
Cattle	17,927	15,773	18,812
Sheep	156,303	155,483	155,234
Goats	7,395	3,609	4,410
Camels	2,408	2,725	2,013

The numbers of camels and sheep slaughtered in the Blue Nile Province decreased by 1,052 and 6,717 respectively, but the numbers of cattle and goats slaughtered increased by 477 and 1,248 respectively, as compared with 1932.

Prices of livestock for local slaughter were exceptionally low but supplies were well maintained throughout the year.

SECTION III.

IMPROVEMENT OF LIVESTOCK.

Cattle.

A lasting improvement of the indigenous breed of cattle under the conditions in which cattle must, perforce, exist in the Sudan, can only be effected by a process of careful selection of the best type to breed from. This involves the elimination of all young bulls of undesirable type by rendering them unfit for breeding purposes. With this end in view, a campaign was started a few years ago to persuade owners to agree to rid their herds of "scrub" bulls and, as the native method of sterilizing cattle leaves much to be desired, special instruments for the purpose were issued to natives trained in their use. Steady progress has since been made in the direction indicated and the foundation has now been laid on which a distinct and lasting improvement in the breed of cattle can be built up. The process will be a gradual one, however, and spectacular results must not be looked for.

A small cattle show was held in Kordofan Province in November and it would be very helpful if such shows could be held on a large scale every year. Unfortunately the risk of disseminating disease is at present too great to permit of this being done.

Horses.

The progress of the horse improvement scheme was impeded last year by the necessity of reducing the expenditure on the upkeep of Government-owned sires. Fortunately, owing to the exceptionally low price of grain, the cost of maintenance was not so great as was anticipated, and some of the savings thereby effected have been made available for the purchase of sires to replace casualties in the stud.

As most of the horse shows in Darfur were not held before the end of the year a full report on the progress of the scheme is not yet available, but the Senior Veterinary Inspector, Darfur Province, reports as follows on the two shows which were held :-

"The results seen at the two shows, coupled
 "with what was observed in Nyala and in the Beni Helba
 "district during a hurried tour, are convincing
 "proof that the scheme is in a healthy and thriving
 "state. All horses were produced in show condition.
 "The number of stud-breds was surprisingly good,
 "especially with the Habbania and Fellata. The fact
 "that some hundred and fifteen first class horses
 "were purchased without difficulty at these two
 "shows for the Sudan Defence Force and that, of
 "these, some twenty were by Arab sires and thirty-
 "five by our Sudan country-breds and approved tribal
 "sires, speaks for itself".

The list of stallions in Darfur Province at the end of the year included 9 Arabs, 1 Egyptian country-bred, 1 of North African origin and 4 country-breds, three of which are by Arab or thorough-bred horses.

The Senior Veterinary Inspector, Kordofan Province, reports that the use of Arab horses by the Humr tribe has not proved successful and it is proposed to introduce half-bred sires from Darfur instead. Although only 400 horses were produced at the Dar-Messeria show it was gratifying to find that 20 per cent. of them were half-bred Arabs.

Poultry.

In most parts of the country the introduction of imported birds to improve the breed of native fowl has become very popular and, thanks to a few enthusiastic poultry-breeders in Khartoum and elsewhere, it has been possible to keep up supplies of fresh blood to those areas in which imported fowls had previously been distributed.

In Darfur Province alone the Veterinary Inspector distributed 173 young pure bred cocks and supplied over 1,100 eggs for sitting.

SECTION IV.

MISCELLANEOUS

Grazing and Water.

During the first three months of the year conditions in regard to grazing and water were reported to be good throughout the country, but during July and August grazing was exceptionally poor in Berber and Kassala Provinces - almost non-existent in certain areas. Good rains fell in August and September but they were rather later than usual in most areas, and were very unequally distributed in certain parts of the country, particularly in the North-east. By the end of September grazing was reported to be plentiful throughout Central and Southern Sudan but conditions remained unsatisfactory to the north of Khartoum and in some parts of Kassala Province. Towards the end of the year grazing was very scanty in the Southern district of Berber Province and the cattle were consequently in poor condition.

The work-oxen in the irrigated area, Blue Nile Province, lose condition during the summer, particularly at the time when their services are in most demand on the land under cultivation. To obviate this Mr. G. Fleming, Manager of the Kassala Cotton Company, stored a reserve of forage for his oxen in silo pits and the resultant ensilage was reported to be of good quality.

Several fatal cases of poisoning by hydrocyanic acid occurred at the Gezira Research Farm, Blue Nile Province, amongst cattle fed on green forage (*Sorghum vulgare*) which had wilted following late rains.

Livestock Shows.

The usual tribal gatherings and horse fairs were held in the various Provinces during the year and again proved their value to the Government in establishing closer contact with the stock-owning tribes. Remounts required for Army and Civil purposes are usually purchased at these gatherings and they have become annual events which the natives eagerly look forward to and thoroughly enjoy.

Purchase of Remounts.

The mule and camel requirements of the Sudan Defence Force, amounting to 126 riding camels, 9 hamla camels and 89 Abyssinian mules, were purchased in Kassala Province during the year.

As a result of the energetic campaign carried out in Darfur Province during the past six or seven years with a view of improving the breed of horses there, 170 first class remounts for the Sudan Defence Force were purchased without difficulty at the various shows held in 1933.

In Kordofan Province 40 horses - police and army remounts - were purchased during the year.

Veterinary Hospitals.

The number of animals which received treatment at the Veterinary Hospitals in Khartoum and Wad Medani during the year were as follows :-

Khartoum	.....	909
Wad Medani	.....	<u>4,622</u>
		5,531
		=====

The total number of patients treated in these hospitals last year was 6,800.

At the shoeing forge attached to Khartoum Civil Veterinary Hospital 1,516 pairs of shoes were fitted and 238 horses and mules had their feet rasped and trimmed.

Acknowledgments.

In concluding this summary of the activities of the Veterinary Service the writer takes the opportunity to express his grateful appreciation of the capable, efficient and loyal manner in which all members of the Veterinary Staff have carried out the duties demanded of them. The period under review was a particularly trying one and, with the small staff available, the year's achievements reflect great credit on both the "field" and laboratory organizations.

(Sgd.) W. Kennedy

Sadik

DIRECTOR, SUDAN VETERINARY SERVICE

A P P E N D I X

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R E P O R Tof theVETERINARY RESEARCH OFFICER, S.G.

ANNUAL REPORT
OF THE
VETERINARY RESEARCH OFFICER
SUDAN GOVERNMENT
1933.

A. S T A F F.

The classified staff throughout the year has consisted of myself, one Assistant Veterinary Research Officer, one Laboratory Assistant and one Sudanese Clerk. The Assistant Veterinary Research Officer (Mr. J.T.R. Evans, B.Sc.) continued permanently at the Serum Laboratory at Malakal, and I was unable, on account of pressure of work, to tour away from Khartoum. The distribution of work made it necessary for the Assistant Veterinary Research Officer and myself to take our leaves simultaneously so that from mid-July to late October the Laboratory Assistant (Mr. P.A.C. Kenny) was again left in sole charge; during the latter's period of leave, from mid-April to mid-July, I was without a technical assistant.

At the end of March the Laboratory suffered a sad loss in the death of the clerk (Osman Eff. El Mahdi) after a long period of ill-health. The feeling of personal loss at the death of a member of the staff with whom one was in daily contact was aggravated by its occurrence at a fairly busy period. The vacancy has been filled and the new clerk (Ali Eff. Dalil Ibrahim) has quickly acquired competence in the more technical branches of his duties.

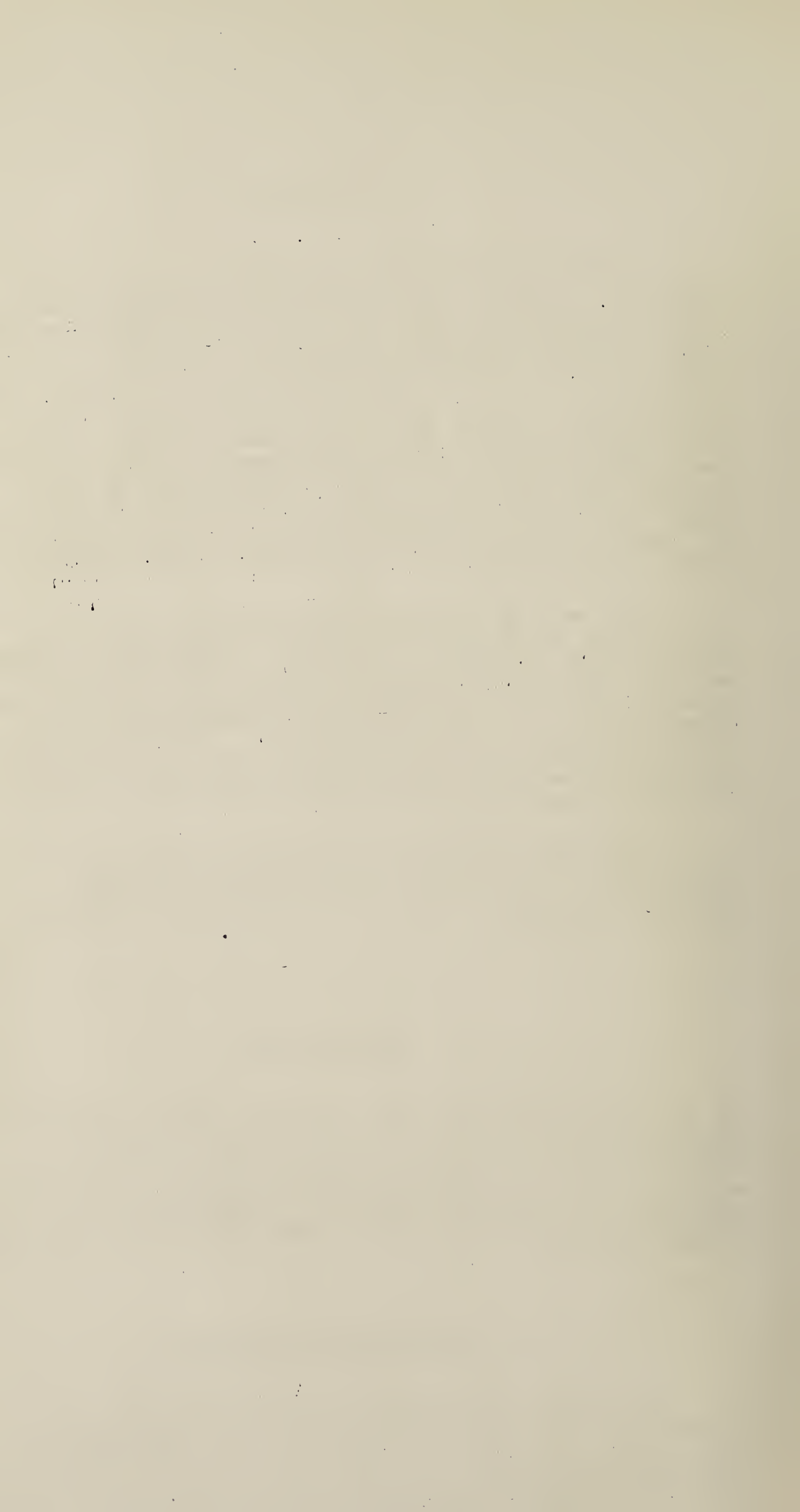
The small size of the classified staff has to a considerable extent been compensated by the high efficiency to which some of the Laboratory Attendants have now attained.

B. ROUTINE WORK

The routine work has, as usual, mainly consisted of the following duties :- Preparation of cattle plague antiserum, preparation of bovine pleuro-pneumonia vaccine, issue of diagnostic materials and naganol for the control of camel trypanosomiasis, examination of material submitted for diagnosis, and maintenance of the Veterinary Service library.

I. CATTLE PLAGUE ANTISERUM

The aim of the Malakal Serum Laboratory is now to produce 5,000 litres of serum (100,000 full "doses" of 50 c.c.). In 1932, the first year in which this output was attempted, the total only reached 94,000 odd doses, but in 1933 a few doses over the 100,000 were prepared. Titrations of potency showed it all to be up to standard.



Working conditions throughout the season were generally favourable, but since the Sudan is at all times a difficult territory in which to prepare serum this assessment of conditions mainly implies that difficulties occurred singly and they were thus more easily overcome than if fortune had been less kind.

The permanent staff worked well, but owing to the unavoidable situation of the laboratory in a position badly infested with mosquitoes every Laboratory Attendant was at some time or other sick with malaria. The number of Laboratory Attendants employed (seven) is considered to be an absolute minimum for the technical work required, and a breakdown was only avoided by their conveniently being sick one at a time.

The non-established staff of about eighty Upper Nile natives also worked well on the whole. They were, however, responsible for one anxious moment when, following the dismissal of several of them for mass disobedience, a threatening demonstration was made at night around the Laboratory Attendants' quarters. Fortunately a message was got through to Malakal and on the approach of a car the demonstrators made off.

Serum producing cattle remained in fairly good condition, mainly owing to the reservation by the Governor of a larger grazing area for the laboratory. Intercurrent disease, chiefly trypanosomiasis, gave some trouble, but not sufficient materially to interfere with the serum output.

The supply of virus producing cattle, however, gave cause for considerable anxiety early in the season. At one period so large a proportion of arrivals proved immune that there was a danger not only of having to suspend operations but of "losing the virus". It was, however, possible to collect an emergency supply of suitable young cattle in the White Nile Province and transport them by steamer to Malakal in time to save the situation and tide over the bad period. Later in the season prospective virus-producers from other districts in the Upper Nile Province proved uniformly susceptible.

In consequence of the increased output of serum it became necessary to ask for an additional room to be built on to the laboratory. This has been done, but certain urgent additions to the operation sheds have been postponed on financial grounds.

A certain amount of the experimental work was undertaken, but the early set-back in routine serum production early in the season made it necessary to abandon this.

Finally, the year's work confirms the opinion already arrived at that it will be very difficult to evolve a routine programme of work at Malakal. Every help is given by the Governor and Province staff, but certain uncontrollable factors militate against the standardization of operations. Until the general situation is more under control it will not be advisable to attempt a larger output of serum.

II. CONTAGIOUS BOVINE PLEURO-PNEUMONIA

The demands for pleuro-pneumonia vaccine have been slightly less than in 1932. A total of 26,420 doses was issued as compared with 31,200 last year.

III. CONTROL OF CAMEL TRYPANOSOMIASIS.

In this section there have been great increases in work. Issues of naganol have increased nearly three-fold as compared with 1932 - from 990 to 2901 doses - and the issues of diagnostic materials and other technical items have increased proportionately. The great increase has been due to the growing demand for treatment on the part of private camel owners (on payment of a fee which barely exceeds the cost of the naganol alone). During the past three years 4200 odd trypanosome-infected camels have been treated in the field with a single intravenous dose of four grammes of naganol with, so far as can be ascertained, one failure to effect a cure. It must, however, be pointed out that of infected camels so treated only about 1,000 were officially owned. It makes little practical difference whether the failures amount to units per thousand or per four thousand - the proportion is in either case negligibly small - but in view of future observations it is necessary to restrict consideration of failures to officially owned camels, since it is only these whose subsequent histories are known.

It is further necessary to state that by a "failure to cure" the laboratory means a case in which the camel lived sufficiently long after treatment for a veterinary officer to be sure, either by recording a persistent positive mercuric chloride reaction or by again seeing trypanosomes in the blood, that all trypanosomes had not been killed. Occasionally it happens that infected camels cannot be treated until they are already nearly dead. A dose of naganol will clear them of trypanosomes but will not prevent their dying; these are not included in one's records. In addition, occasional deaths in previously treated camels are recorded from non-veterinary sources as being due to trypanosomiasis - a diagnosis that tends to be as overworked as some of the camels. These also are not included.

IV. EXAMINATION OF SPECIMENS.

There has been a slight increase in the number of specimens submitted from the field, 447 having been examined as compared with 423 in 1932. Most of these were of no particular interest, and only those worthy of special mention need be reported.

1. Epizootic Lymphangitis.

A year rarely passed without some noteworthy case of this disease coming to notice, and 1933 has provided the following :-

- (a) A horse suffering from obscure skin disease, and under observation in the laboratory. In the course of thorough skin examination a few quite ordinary tick bites were found under the root of the tail. One of these was suppurating and microscopic examination of the pus revealed the presence of cryptococci. The horse was shortly afterwards destroyed, and on post-mortem examination a retroperitoneal abscess containing about 250 c.c. of pus was found. The pus was swarming with cryptococci in pure culture.
- (b) Another horse under laboratory observation for other reasons. On one fore coronet there was an obvious "tread" wound, but this did not heal with simple treatment. Microscopic examination showed cryptococci to be present.
- (c) Mule, Upper Nile Province (recorded by Mr. W.H. Glanville). One day on inspection a watery discharge was noticed from the right nostril. The next day the discharge was purulent, and microscopic examination showed cryptococci present. The mule was destroyed and on post-mortem examination a cream coloured friable growth, about 10 x 6 cm. and raised about 1 cm. was discovered on the right septum nasi. The whole growth was sent to the Khartoum laboratory and its nature as a cryptococcus lesion confirmed.
- (d) Horse, Upper Nile Province (recorded by Mr. W.H. Glanville). A purulent nasal discharge was examined microscopically and cryptococci demonstrated. The discharge was seen on a single occasion only, and on this account the horse was transferred to the Malakal laboratory for further study. At the end of the year the horse was still under observation, and the Assistant Veterinary Research Officer reports that, over a period of about six weeks' observation, purulent nasal discharge was seen on one further occasion only. On this occasion cryptococci were demonstrable. Microscopic examination of ordinary nasal excretion on other occasions gave consistently negative results.

Apart from the foregoing cases there have been thirty-three positive diagnosis of uninteresting cases of epizootic lymphangitis from most Provinces of the Sudan.

2. Globidium Infection.

One case only has been diagnosed during the year - sent by the Veterinary Inspector, Kordofan (Captain H.B. Williams, O.B.E.). The clinical report accompanying the case afforded no fresh information but was confirmatory to that of earlier cases, the most interesting practical observation being of inability to do hard work owing to muscular weakness.

Examination in the laboratory showed ^{the} external infestation to be localised chiefly in the legs. Post-mortem examination revealed moderate infestation of the subcutaneous tissue and skin of all four legs, with a rapid spacing out of cysts on progressing towards the trunk. Occasional cysts were, however, to be seen in the subcutaneous tissue all over the body. A few cysts were found in the false nostrils, although these were not detected during life. As in all earlier cases, there was considerable infestation of the epiglottis. Beyond confirming the nature of the infection, no microscopic studies were made.

3. "Vincent's Angina" in Horse.

A microscopic preparation from an ulcer inside a horse's nostril was received from Bara (Northern Kordofan) showing large numbers of the spirochaetes and fusiform bacteria characteristic of "Vincent's Angina". The case is probably of no economic interest, but it is worthy of mention, if only as being the first of its kind to be recorded in the Sudan.

4. Trypanosomiasis.

As in earlier years several positive specimens have been received. Bovine infection with T. congolense has provided its normal quota from Southern Kordofan, but the Upper Nile Province has provided more than usual. From further advice from the latter Province it seems that it has suffered fairly heavily from bovine trypanosomiasis, a circumstance that may have unpleasant reflections in the serum laboratory at Malakal.

In addition to a few cases of equine trypanosomiasis from Southern Kordofan (both T. brucei and T. congolense) there were a large number from a single outbreak in the Upper Nile Province. A party of eighty-odd horses and mules passed through a tse-tse area with the result that forty-one of them developed trypanosomiasis and died. A number of blood films sent to the laboratory showed that T. brucei was the causal agent.

5. Bovine Theileriasis.

Several blood preparations containing Theileria were received but, as all indigenous cattle seem to be naturally premunised in regard to this infection, these diagnoses had, with one exception, no great significance. The exception was a fatal infection in a Jersey bull recently imported by a private dairy owner. This case was exactly parallel with others recorded in this Report in 1929 and 1930, confirming the observation that local Theileria infections, while having negligible effects on indigenous cattle are highly fatal to imported stock.

6. Haemorrhagic Septicaemia.

On several occasions in the past blood films have been sent to the laboratory from cattle suspected on clinical grounds of having died of haemorrhagic septicaemia, but on no occasion has the characteristic causal organism been seen. In 1933 films of blood and of exudate from a local swelling were received from such a beast which died **in the Blue Nile Province**; large numbers of typical Pasteurella organisms were present in a state of purity. Even in the absence of cultural studies of the causal organism it is therefore permissible to conclude that haemorrhagic septicaemia exists in the Sudan. Information at present available indicates, however, that outbreaks are small and relatively infrequent, the disease is at any rate immensely overshadowed by more serious epizootics.

7. Miscellaneous.

In addition to the foregoing items which are worthy of special annotation the following diagnoses have been made :-

- Horses : Ulcerative lymphangitis, piroplasmosis, ringworm, cutaneous habronemiasis (on one occasion with worms in skin scrapings), and filariasis.
- Mules : Ringworm, filariasis.
- Cattle : Anaplasmosis, piroplasmosis.
- Donkeys: Trypanosomiasis (*T. congolense* and *T. brucei*), filariasis.
- Dogs : Trypanosomiasis (*T. congolense* and *T. brucei*).
- Fowls : Spirochaetosis.

Also a variety of bacterial and helminthic infections.

V. LIBRARY

As reported in 1932, the library has outgrown its accommodation, but in consideration of the present financial situation expansion seems to be impossible. Moreover, no periodicals since those of 1931 have been bound. The consultation and conservation of scientific literature are among the most important of the Laboratory's functions, and the scattering of periodicals, a growing proportion of which are unbound, adds considerably to one's labours.

C RESEARCH

Routine work, in both the Khartoum and the Malakal laboratories has now attained a volume that leaves little scope for research. Records of large scale operations in the control of camel trypanosomiasis and bovine pleuro-pneumonia continue to be collected for subsequent analysis, but the only deliberate researches attempted have been in connection with cattle plague.

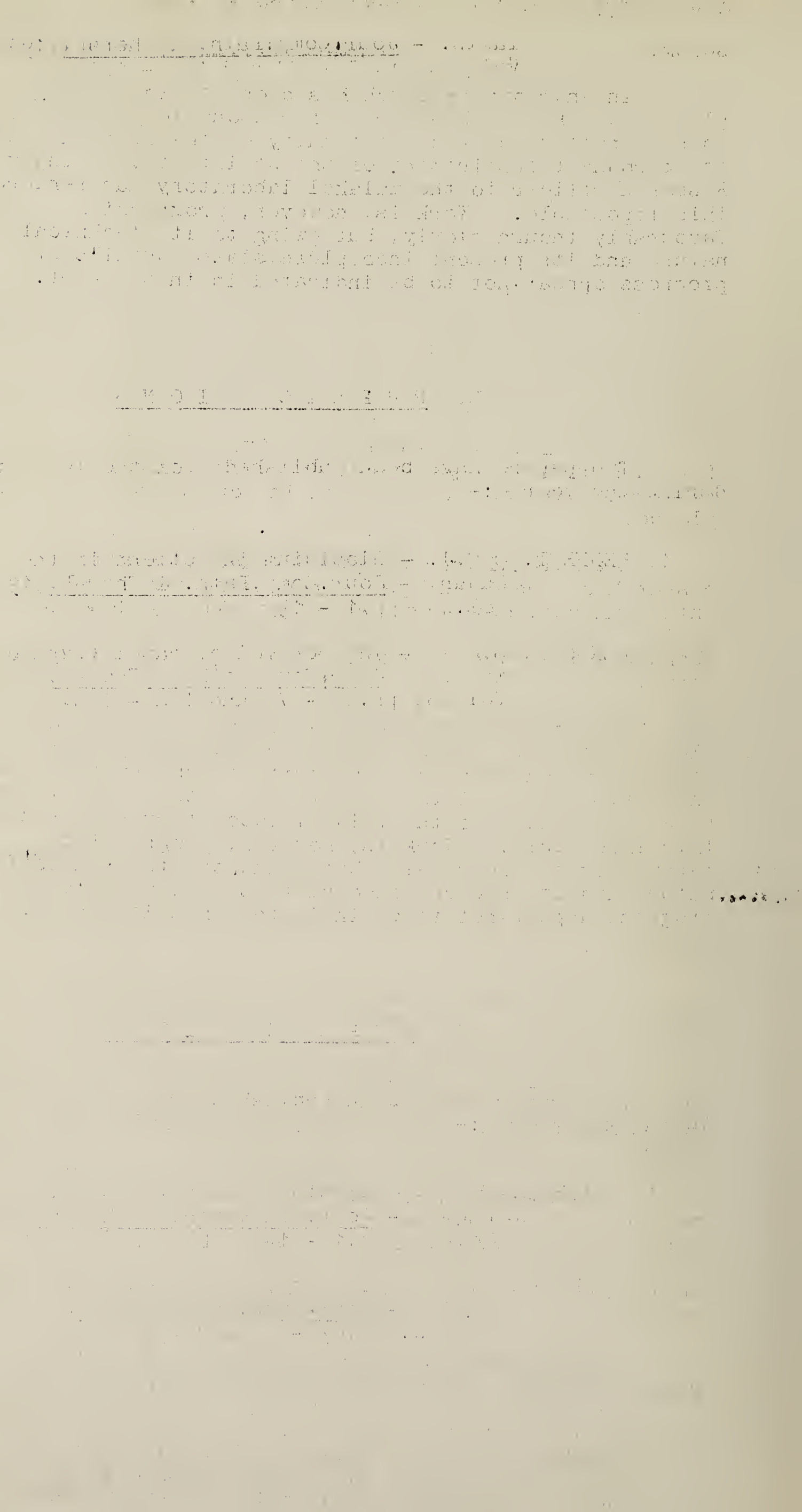
At Malakal an attempt was made to continue research on the technique of preparing cattle plague antiserum but, owing to the delays already described in the section on routine work, the attempt had to be abandoned in order to produce the required volume of serum.

In Khartoum research has been continued on cattle plague vaccine. This work, if reasonable progress is to be expected, demands continuity of observation and the permanent appointment of the Assistant Veterinary Research Officer to the Malakal laboratory has rendered this impossible. Work is, however, progressing favourably though slowly, but owing to its technical nature and its present incomplete state, details of progress appear not to be indicated in this report.

D. PUBLICATIONS.

Two papers have been published from the laboratory during the year :-

1. BENNETT, S.C.J. - Globidium infections in the Sudan. - Jour.Comp.Path. & Therap., 1933, Vol.46, pp.1 - 15.
2. BENNETT, S.C.J. - The control of camel trypanosomiasis. - Jour.Comp.Path. & Therap., 1933, Vol.46, pp.67 - 77 and 174 - 185.



E. S U M M A R Y

The year has been characterised by a general increase in routine work; a slight decrease in the issues of pleuro-pneumonia vaccine has been more than counter-balanced by a slight increase in the number of specimens examined, an appreciable increase in the volume of cattle plague antiserum prepared, and a great increase in the issue of materials for the control of camel trypanosomiasis. Correspondence, and the total of stores etc. handled have increased proportionately. The Khartoum laboratory continues to grow more overcrowded, and the Malakal laboratory has attained its fullest working capacity.

Research has been continued, although of two items undertaken one had to be abandoned, and the other, through lack of continuity of observation, progressed very slowly.

The staff have worked extremely well, in particular the Laboratory Assistant who remained in sole charge during the leave season, and the Head Laboratory Attendants both at Khartoum and Malakal who, although "unclassified", have acquired a high technical competence and have of necessity had considerable responsibility thrown upon them.

Khartoum,
31-1-1934.

Sadik

(Sgd.) S.C.J. Bennett

VETERINARY RESEARCH OFFICER,
Sudan Government.

